AMATEUR RADIO

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NOVEMBER, 1939

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EDITORIAL

. . WHAT CAN I DO?

In these days of War that phrase is in the mind of every Ham in the country who has not already enlisted or been called up for service. Many are in Reserved Occupations, many are on properties in the midst of Harvesting and Shearing, but all are desirous of doing something in this time of need. If your position is such that you cannot enlist for some time to come, there IS still one thing you can do—become a better operator.. Whilst it is no longer possible to practice on the air there is an unlimited number of signals to which you can listen, and the building of a small oscillator for sending practice is a small job indeed.. To those who, in the past, have considered that the CW man was out of date, and that the learning of Morse was a useless drudgery, a real lesson stands out in this time of emergency.. As a W/T operator capable of handling traffic at 25 w.p.m., a Ham is invaluable to his Country to-day, below 16 w.p.m. practically useless, until he has had further Morse training. Operating ability is the prime asset alone. Technical knowledge is naturally of some value, but only as an adjunct, for this business of War is a highly specialised one these days, and from the viewpoint of the Services, operators and more operators are what they need from the Ham ranks.

It is of interest to note what has been written in the Motherland on this subject.. Our quotation is from a letter in "Wireless World." " . . . far many more operators . . . are required than 'technical wizards'. This is true of all the Services, and time has proved it. Therefore the Services aim at producing the operator first and telling him just what he needs to know about the gear to work it with efficiency . . This is the age of specialisation, and a separate staff is trained to deal with the purely technical side." Another comment, more from the Ham viewpoint is of interest also. "Technical knowledge and proficiency, unless of the right kind, are not enough in themselves. Most wireless people, and particularly Amateurs, tend to be individualists, but individualism is quite out of place in the intricate communcation system of the modern Defence Services. Team work, precise synchronisation, and strict adherence to rules and procedure are essential to a successful Wireless Service."

This all means simply and plainly one thing. 99 out of every 100 of our Amateurs, who enlist, will be required as operators alone, and therefore, it is up to every Ham in the country to see he IS an operator, a first-class one, when his call comes.

PURE RESEARCH. Journal of I.E.E., August, 1939.

The President of Massachusetts Institute of Technology, remarked recently that nothing worthwhile ever came out of research directed towards an object. As an illustration, he said that if 50 years ago the lighting trade had carried out research with a view to improving lighting, it would have dealt with wicks, oil, glass chimneys and so on, and the last thing which would have been considered would have been electrons and discharges through gases.

A Review of Radio Receivers

By Courtesy of The Amalgamated Wireless Valve Co. Pty. Ltd.

Introduction.

This article is the first of a series intended to cover, fairly comprehensively, the field of Radio Servicing. Each paper will be devoted to one phase of the subject, without any attempt at generalisation.

In this, the first, it is intended to consider the high-frequency section of existing receivers, with particular attention to those aspects which concern the service engineer.

The discussion is necesarily brief and the reader would do well to follow up the subjects introduced, in the third edition of "The Radiotron Designers' Handbook," which is soon to appear. In this publication the subjects are approached from the point of view of a designer, but much of the information will be found invaluable as a background for service work.

(A) Aerials.—Listeners in remote country districts invariably realise the need for an efficient aerial and earth system. Such an aerial, however, has disadvantages even apart from its cost and unsightliness in urban areas where field strengths from desired stations are high.

One disadvantage is that a large aerial seriously loads, and impairs the selectivity of, the first tuning circuit in a receiver. In modern receivers the effect is not usually serious, but in older T.R.F. sets having low initial selectivity the loading was quite sufficient to cause interference between stations, and necessitated different tappings for long, short and medium aerials.

Another disadvantage, which is manifest in modern receivers, lies in the fact that high input voltages invariably mean high values of bias on the bias-controlled amplifiers. The nett result is that in most cases the intermediate frequency amplifier is called upon to handle large inputs when operating on the bent portion of its characteristic. The resulting "Envelope Distortion" contributes materially to the overall distortion in a receiver. In most receivers the effect becomes apparent for inputs above .5 volt.

A very similar effect occurred in certain old type receivers in which a variable bias was applied to sharp cut-off valves such as type 224 (24A). The distortion in such cases became very distressing indeed when the volume control had to be turned back to cope with strong signals.

The average "picture frame" aerial is, however, far from ideal in that when the receiver is not earthed, much of the signal arrives through the house and even the street wiring, and the aerial wire acts in the manner of a counterpoise. It is not difficult to imagine what variations in signal input must occur when lights are switched on and off, or when badly installed conduit gives varying resistance with changes of temperature or mechanical vibration.

Effective A.V.C. systems minimise these effects although the receiver is still in a position to reproduce any electrical interference arriving through the mains. Before the general adoption of the A.V.C. changes in electrical circuits were very often manifest in a sudden change in set output. A very large proportion of service calls for fading appear to be directly attributable to this cause. The routine treatment is to fit an effective earth, and in extreme cases a line filter.

One interesting fact in connection with aerials has been demonstrated by F. R. W. Strafford (of Belling and Lee Research Dept.), that the effectiveness of a receiving aerial is very nearly independent of thickness, within, of course, reasonable limits. The maximum loss of one aerial of 38 S.W.G. as compared to one of 18 S.W.G. was 3 dB in a range of 16-1875 metres.

For obvious reasons it is preferable to use enamelled wire for aerials rather than bare, or even cotton-covered wire. The unprotected metal surface soon becomes badly pitted when exposed to the weather, especi-

ally in localities where the air carries corrosive fumes from factories.

(B) Aerial Coil.—Before discussing the aerial coil or indeed any radio frequency circuit in a superheterodyne, the function of the frequency changer must be clearly understood.

When the oscillator section of such a valve functions it produces not only a fundamental frequency but many harmonics. Each one of these is mixed in the valve with the incoming signal to produce sum and difference frequencies, all of which appear in the plate circuit. It is the function of the intermediate amplifier to select and amplify the one wanted frequency, rejecting all others. These latter cannot normally produce any audible tones.

When, however, some carrier frequency in addition to the wanted signal arrives at the signal grid, this carrier frequency beats with a harmonic from the oscillator which may produce a frequency at or near the intermediate frequency, and sufficiently strong to cause an audible beat note with the desired signal.

It is the function therefore of the signal frequency circuits to attenuate as much as possible all signals but the desired one.

Again it is generally realised that of all valves in a normal receiver, the frequency changer introduces the most noise. For this reason it is highly desirable to have as much gain as posible ahead of this valve.

In a typical 4-5 superheterodyne the responsibility of selectivity and gain falls entirely to the tuned aerial coil, so that its design and alignment are critical factors in receiver performance.

Up till recently the usual aerial coil consisted of a low impedance primary wound about the "cold" end of a solenoid of solid wire. Although fairly satisfactory on local stations, such an arrangement left much to be desired when distant signals were to be received.

One characteristic common to most receivers is that they tend to be more sensitive at the high frequency end of the bands where the L/C ratio of the tuning circuits is higher. The low impedance primaries usually associated with solenoids when connected to a large aerial resonated just beyond the high frequency end of the band, or in the worst cases, just inside the band. The result was to increase further the high frequency sensitivity and to accentuate the variation across the band.

The modern high impedance primary is so designed that with the shortest aerial likely to be used, it will resonate below the low frequency end of the band. A single turn in series with the "hot" end of primary wound in close proximity to the "hot" end of the secondary gives some capacity coupling between aerial and grid, and tends to maintain the high frequency sensitivity. Such a coil may be so adjusted as to give, in conjunction with the remainder of the receiver, a fairly level sensitivity characteristic.

Moreover, the simple solenoid secondary has largely been discarded, since in the broadcast band much better selectivity and higher gain are attainable by the use of litz honeycomb winding and powdered iron cores.

When, as often happens, the service engineer is faced with a set having high noise level and objectionable "joeys" which cannot be eliminated, the trouble can frequently be minimised by the simple expedient of replacing an old fashioned aerial coil with a modern type.

On the short-wave band the position is different, and interwound coils with low-loss formers and heavy single-strand wire for the secondary are commonly used. Iron cores have been used to a limited extent on the short-wave band, but their advantages are less marked than on the broadcast band.

(C) R.F. and Oscillator Coils.—The foregoing remarks apply in general to the R.F. coil, but not for the oscillator coil, where the problem is quite different.

Here the solenoid is generally regarded as satisfactory, although for reasons of symmetry and compactness some designers prefer the more modern type of winding.

Apart from correct electrical design the oscillator coil must be, firstly mechanically rigid, and secondly impervious to moisture. Both requirements are readily fulfilled by a compact honeycomb winding dipped in a good wax. Many receivers have been produced in past years having untreated oscillator coils, and great difficulty has been experienced in that, during damp seasons, the oscillator has failed to function on the

low frequency end of the band. The effect is particularly noticeable in battery receivers where the oscillator has less in reserve.

The trouble may usually be remedied by thoroughly impregnating the coils in hot wax of a low-loss variety.

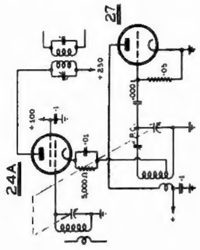


FIG. 1

(D) R.F. Amplifiers.—Early radio receivers, few of which were superheterodyne, employed general purpose triodes as R.F. amplifiers. Due to their high grid-plate capacitances the valves were prone to instability and receivers were normally limited to a single low gain stage ahead of a regenerative detector. The introduction of neutralisation made possible the use of two, three or more stages with much higher overall gain and selectivity.

Radio frequency tetrodes with lower internal capacitances (grid to plate) eliminated the need for neutralisation and made posible much higher R.F. gain. Modern R.F. pentodes such as type 6U7-G under optimum conditions give good stage gain to frequencies as high as 30 megacycles. At such frequencies the importance of coil formers and gang insulation cannot be overemphasised. For instance the Q of a coil can be improved two or three times by substituting a trolitul former for some types of cardboard or bakelite. Coils for broadcast reception have already been discussed.

In a superheterodyne, the desirability of attaining high gain and selectivity ahead of the frequency changer has already been stressed, and it is obvious that an efficient R.F. stage affords both. From experience it seems that an R.F. stage is highly desirable in receivers intended for country use, or where the user is interested in long distance reception whether on broadcast or short-waves. Apart from the improvement in signal to noise ratio and image ratio, the added sensitivity contributes materially to the effectiveness of the A.V.C. system, as seen in its ability to cope with a weak fading signal.

In suburban areas where the receiver is rarely tuned to any but local stations the R.F. stage may not justify its cost.

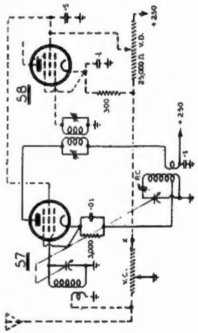


FIG. 2

(E) Frequency Changers.—Something has already been said on this subject in section B. Briefly the function of the frequency changer is to mix with the incoming signal another generated by itself, of a separate oscillator valve, to produce a frequency equal to the intermediate frequency of the associated receiver.

Three types are commonly met in radio service work, namely tetrode or pentode mixer with separate oscillator, autodyne, and pentagrid converter.

The first of these was very popular about 1929 to 1930 in the form illustrated in figure 1, and used the then modern type "24" with a "27" separate oscillator. The arrangement was generally very reliable and servicing rarely goes beyond replacing some faulty part or valve. Occasionally it may be necessary to repair an open circuited winding.

The autodyne, which came into popular favour about 1932, was rather more critical in operation than the older circuit. Figure 2 is a typical circuit arrangement. Frequently the oscillator coil assembly was mounted in the same can as the first intermediate, but this did not lead to any ill effects due to the widely different working frequencies.

In all autodyne circuits the primary of the first intermediate transformer is in series with the oscillating circuit, and since the oscillator frequency is higher than the intermediate the reactance of the transformer is capacitive. (See figure 2). For this reason the primary of the intermediate transformer should always be designed for high C, to offer as little impedance as possible to frequencies higher than the intermediate frequency. This point should always be borne in mind when dealing with this type of circuit.

One serious disadvantage with the autodyne is that it cannot be used with variable bias to control the gain. Hence effective A.V.C. is impractical with 4-5 valve superhets using this circuit. Even manual volume control presented a problem in providing smooth control on the strongest stations. The dotted portion of figure 2 illustrates the usual method adopted. The potential at point X on the volume control is very important. If it is too low the volume control becomes very critical on a strong local, and frequently complete attenuation is not possible. Too high a voltage will cause the intermediate amplifier to reach cut-off before the signal is sufficiently attenuated at the aerial terminal, and very distressing distortion can occur. The aerial shorting path needs to have a very low resistance, particularly with a low impedance primary. It is advisable to take the aerial lead directly to the volume control terminal and thence to the coil, as this ensures the most effective shorting.

Autodynes have seldom, if ever, been used commercially in dual-wave receivers due to the difficulty in maintaining satisfactory oscillation across the short-wave band.

The introduction of pentagrid converters made possible the application of A.V.C., and later dual-wave reception, to small receivers. With old intermediate frequency transformers the pentagrid gave less sensitivity and selectivity than the autodyne, but this was soon offset by the more efficient intermediates and coils which were introduced. A typical pentagrid converter circuit using the type 6A8-G is shown in figure 3.

Generally speaking pentagrid converters are not critical in operation, but there are certain points to watch. Element supply voltages should be maintained reasonably close to manufacturers ratings, as under some conditions excessive current may flow to one or other of the electrodes and cause overheating and release of gas. Again the oscillator grid current, which is an indication of oscillator amplitude, should be maintained within the limits given by the valve manufacturers for the particular frequency at which the valve is

operating. Insufficient grid current means low conversion conductance and loss of sensitivity. Excessive values also cause low conversion and conductance, and in some cases very noisy and erratic operation. In all cases the oscillator grid leak should be of the recommended value.

A grid current test can be applied to all common oscillators (with the exception of the autodyne) as a test for oscillation. To do this an 0-1 milliammeter is connected in series with the cold end of the oscillator grid leak. If the valve is oscillating a definite deflection should result, being usually between .1 and .6 milliamp. Battery converters usually operate with lower grid currents than A.C. types.

The best test for autodyne frequency changers is to measure the plate current, first normally, and then with some section of the oscillator coil shorted out. The plate current of an autodyne should fall appreciably when oscillation is suddenly stopped.

The popularity of short-wave reception has emphasised some shortcomings of normal pentagrid converters which are not so evident on the lower frequencies. One is that any variation in the voltage applied to one or more of the electrodes tends to change the frequency of the oscillator section. By far the most important of these to the listener is the effect of the variation in signal grid bias caused by A.V.C. circuits. The drift is negligible on the broadcast band, but is quite serious on the short-wave channels. The effect is that as a signal varies in strength it causes a corresponding variation in A.V.C. bias, which when applied to the converter grid alters the frequency of the oscillator and therefore of the I.F., which is equivalent to detuning. Distortion as well as loss of sensitivity usually results. An obvious cure is to operate the converter on fixed bias, but in receivers where the number of controllable valves is limited this is not always possible.

The supply voltage in the receiver has also a marked effect on oscillator frequency, and many motorboating complaints are traceable to this. When a strong signal is tuned-in the plate current (and hence plate voltage drawn from the power supply) varies, and tends to detune the oscillator. The resulting drop in signal restores original voltages and once again the oscillator returns to resonance, and the original cycle is repeated. If, as frequently occurs, the time constant of the anode supply is sufficiently short, and the frequency drift of the oscillator appreciable, an audible "motorboating" is produced. Obviously the removal of either condition eliminates the trouble. The recommended treatment is to feed the oscillator anode directly from the rectifier filament through a resistor, and to by-pass the plate feed with an 8 mfd electrolytic condenser.

Two valves, namely, the 6K8-G and 6J8-G, have been developed with a view to reducing frequency drift and its attendant complications. The 6K8-G oscillator coil differs from the normal design in that approximately one half the usual number of feedback turns are required for optimum coupling. Overcoupling

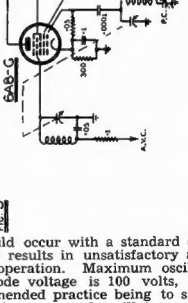


Fig. 3

as would occur with a standard coil usually results in unsatisfactory and noisy operation. Maximum oscillator anode voltage is 100 volts, the recommended practice being to supply both screen and oscillator anode through a common 15,000 ohm resistor. The 6J8-G has a high plate resistance which improves the selectivity and also, when it is followed by a high Z (Z equals dynamic resistance) intermediate frequency transformer, enables good sensitivity to be obtained. In order to improve the oscillator strength and stability, the tuned oscillator circuit for the 6J8-G is frequently placed in the

plate circuit, and the untuned (primary) winding in the grid circuit. Although these two valves may appear from a circuit diagram to be similar to a pentagrid both valves represent a radical change in valve design.

(F) Intermediate Frequency Amplifiers.—As already indicated, the image ratio and signal to noise ratio of a superheterodyne receiver are almost entirely a function of the gain and selectivity of the signal frequency circuits, but the final selectivity curve and to a lesser extent the sensitivity are determined by the design of the I.F. amplifier.

The majority of home receivers employ but a single amplifier valve in association with two high gain I.F. transformers. The maximum gain attainable by this arrangement is no more than necessary for modern requirements, and some designers prefer to use two lower gain stages which, despite the cost, can be made to give a much more ideal selectivity curve, in that although the adjacent channel selectivity is better the peak is less pronounced and more rounded. This latter point is very important in the attainment of fidelity of reproduction, since a sharply peaked selectivity curve invariably results in serious high note attenuation and "woolly" reproduction. Even well designed two stage channels exhibit this failing to a lesser extent, and accounts for the arduous searchings of engineers for a cheap and reliable method of obtaining a flat topped selectivity curve. More may be said in this connection at a later stage.

Actually sharply peaked circuits are desirable in communication receivers when receiving C.W. signals, and regeneration or crystal filters are used to obtain this result.

Early I.F. transformers consisted of two solid wire honeycomb windings tuned by two mica di-electric compression type trimmers, mounted on a moulded bakelite base. In the search for higher Q which followed the introduction of pentagrid converters and diode detectors, and of course dual-wave reception, the solid wire was rejected in favour of multistrand litz, which gave much lower values of "skin-effect" resistance. The insertion of an iron-dust core in the windings allowed the same values of inductance for much less wire, and hence still lower high frequency resistance.

The mica dielectric trimmers previously mentioned were characterised by two serious failings. The first was a slow change in capacitance as the adjustable plate gradually lost tension and altered its shape. In some cases where particularly robust plates were used the change in capacitance could be traced to the rivets at the fixed end of the variable plate. The second drawback was that unsuitable mica and bases tended to absorb moisture in humid weather and allowed serious high frequency leakage to occur. Careful selection of raw materials and better design were found to minimise both effects, but many designers were still not satisfied. Air dielectric trimmers are an obvious solution, but are bulky and costly without always being rigid mechanically.

A very satisfactory arrangement is to use a sealed fixed tuning capacitance and to vary the inductance of the coil by means of an adjustable portion in the irondust core. The resultant gain and frequency stability meet present day requirements.

The intermediate frequency has an important bearing on the performance of a receiver. For satisfactory converter performance a certain percentage difference should be maintained between the local oscillator and signal frequency. If the maintained between the local oscillator tends to "lock" with the incoming signal. This tendency, of course, varies widely with different valve types and circuit arrangements but must be taken into consideration when original design work is done.

In normal superhetrodyne receivers a station tends to reappear at a frequency removed from its calibrated position by twice the intermediate frequency. Most receivers operate with the oscillator higher than the signal, so that this "image" would appear at a lower frequency than the correct position. The attenuation of this "image" is determined solely by the selectivity of the signal frequency circuits.

The early adopted standard of 175 Kc/s. allowed adequate gain and selectivity to be obtained from comparatively cheaf I.F. transformers, but tended to produce images only 350 Kc/s. away in a band which was 950 Kc/s. wide. Adequate image suppression with the coils then available called for at least two tuned circuits ahead of the frequency changer. This meant that 4-5 recei-

vers were almost invariably fitted with pre-selector coils.

The general adoption of 465 Kc/s. as the intermediate frequency has eliminated this trouble since the images normally fall beyond the limits of the broadcast band. The loss in gain and selectivity has been made up largely by improved transformer design.

On the short-wave bands where the selectivity of the signal frequency circuits is comparatively poor, images are very obvious but are usually tolerated in household receivers. Special communication receivers for short-wave reception almost invariably use several stages of I.F. amplification at a frequency of about 1,800 Kc/s., giving images which are 3.2 megacycles away from the calibrated position. In some cases two frequency changers are used. The first changes to a high frequency to avoid image reception, and the second to a fairly low frequency for the sake of obtaining high gain and selectivity.

When aligning I.F. amplifiers care must be taken in the final selection of frequency to avoid heterodyne whistles on some stations. When this trouble does occur, it is generally possible to shift the whistle to a position on the dial where it matters less by shifting the intermediate frequency by a few kilocycles per second.

(G) Detectors.—The question of detectors in relation to audio fidelity will be dealt with in the next lecture, and it is proposed to discuss detectors at this juncture only in respect to their effects on the tuned circuits with which they are associated.

The operation of the grid leak detector is well known and scarcely warrants repetition in full. Since such a detector operates under conditions of zero bias, the control grid draws current over portion of the input cycle, and in so doing loads the input circuit and reduces its Q factor. The application of a positive feedback offsets this effect and results in an apparent Q factor much higher than the original. The grid leak detector with positive feedback is eminently suited to positions where detector sensitivity is of prime importance.

When, with the introduction of R.F. tetrodes and pentodes, it became possible to achieve high gain before the detector ,"reaction" with its undesirable features was no longer necessary and designers rejected the leaky grid detector in favour of anode bend detection with a screen grid or pentode valve. This latter detector operates with a high negative bias on the control grid and hence offers no appreciable loading to the input circuit. The gain is high and the output voltage capabilities better than the grid leak detector. Nevertheless distortion in an anode bend detector is much higher than in a well designed diode circuit, and it does not offer facilities for obtaining A.V.C. bias. With few exceptions modern usage of anode bend detectors is confined to communication receivers where lack of circuit loading is important.

The operation of diode detectors is discussed in section 1 (A.V.C.). In general, the diode is characterised by its ability to handle large signal voltages, by low distortion and lack of gain. However a modern duo-diode high-mu triode or duo-diode pentode is capable of giving gain in a "single" valve comparable to earlier types. For normal household receivers it would seem to be the obvious choice.

End of Part I.

Double Detecting Super Experiments

By M. Howden, VK3BQ.

In these days of silent local bands and skeleton racks taking up useful room in our shacks, we seldom bother even to go into them, but now and then the old urge enters and we switch on the RX to see what is doing on the bands overseas. Now is the opportunity to solder that loose connection that we have not been bothering about.

And now the set is quieter there is still not much satisfaction in just listening when you can't even try to raise the DX. Why not try a few experiments to see if we can improve the receiver still more, and then, when we get on the air again, we can make the most of it.

That Dope on the double detecting super in July QST by W9CJJ - and W9AUJ gives one something to think about. Suppose we pull out the first 465 KC IF tranny and substitute a 1600 KC in its place, and couple up the frequency meter through a small padding condenser to the control of the 1st IF tube. Not so good, because we have not lined up the two circuits of the 1600 KC tranny. Perhaps the easiest way to do this will be to run the grid lead from this tranny straight on to the second detector and get it somewhere near, and then revert to the former arrangement, leaving the set tuned to a strong signal while the change is made and then swinging the dial of the frequency meter until they come in again. A sight re-tuning of the grid circuit will be needed now to counteract the detuning effect of the grid loading on the 1st RF tube, and we find that signals are down to a point or so on what they were before but the set is much quieter and the double spots have completely disappeared and if there was a tendency to self oscillation before it will have gone now and the gain can now be turned right up so that there is no loss of signal strength.

The trouble with this grid injection in the second mixer is that the oscillator (Freq.meter) damps the circuit rather badly so that the conversion gain is rather low. Anyway, there will be plenty of time to fix that next time we come into the shack.

The output from the normal meter is rather low and anyway we don't want the frequency meter continually tied up as a fixed oscillator. Take a note of the exact frequency for future reference and let us substitute any standard "mixer" valve in place of the original 1st IF amplifier. "Bill" was saying the other day that he had a spare, so I'll borrow it and see how she works. And so to bed.

A couple of nights later the urge is once more upon one and having seen Bill in the meantime and succeeded in putting it over, we enter the shack again and listen for a few minutes while the iron heats up. The trouble is that this fixed oscillator coil will have to be wound, and its size must first be calculated or guessed. Let's se2—our old IF was a shade higher than 465, we'll say it was 470 kc, and our new one is round 1600, so that our oscillator will want to be about 1600 plus 470, that's 2070 KC. I know, I'll get a good idea of the size of the coil from the frequency meter coil. Or better still why not rub down that old 200 mx crystal to about 2070 and see what happens. Down she comes, and the output getting better. No, now it's falling again, I suppose one corner is high. Now it's double peaking — well, we'll edge the brute. Ah; that's got him, but it's away down on about 2090 now. Never mind, we can easily retune the IF's to suit that instead. Now there is still the need of a plate coil for the oscillator, and since it will be more convenient to mount it under the chassis and right up against the valve socket, it will need to be quite small. An old Marquis

former cut short and with the base part removed will be the very thing and give one hole mounting. If my judgment is right, about ninety turns of 30 DSC on this former will cover 2090 KC nicely when it is tuned with a little padding variable, so here goes. Ah; the iron is well and truly hot, so I'll alter the connections before worrying about the crystal holder. The old one out of the perk would do, but I may want that again soon, so a couple of plates the size of this little crystal will do, supported by its leads and held loosely together with a rubber band round each way, will do for the tests.

Well, those connections look all right. Now, I wonder if that crystal will oscillate. I'd better screw the padder right out to start with and see if the set will mote. She is taking a long time to warm up — something must be wrong somewhere. No, there's a signal, but mighty weak. Of course, I've got to re-line the IF's to suit the 2090 ascillator. Here she comes — now for the other circuit. Yes, that is a signal. It sounds near, but can't be a local. I have not adjusted the triode oscillator for maximum output yet either. The old set used to work on its side and should still do so as long as the crystal does not slip out of the rough holder. That's got her. Now where is the padder screw. I'll have to bend these leads so that I can get at it easily. The oscillator is stable enough. That's made no difference, so now I'll screw her down. Whew! listen to that conversion gain coming up. Oh! that is too far. It cuts off dead when the crystal stops oscillating. That's about the best setting, so I'll leave it at that. Now I had better set the old freq-meter as a signal generator again and line these IF's properly. That did not take long, and now for some signals. Yes, there are plenty of them, and there is someone talking Spanish, South American, I guess.—Was that a knock at the door? Who would come at this time of night? Oh! Hullo, Bill, come and hear a real receiver. No double spots, far more selective and the background away down. "Yes, it sounds the goods all right, and the signals seem as though they are nearer somehow. That Yank might almost be right here in the room. How do you account for it?" Oh, I put it down to the lack of interlocking in the mixers. The first is 1600 KC off the incoming signal, and I am using a crystal oscillator in the second, and you can't pull a crystal off its frequency, you know. The 1st IF tranny being on 1600 instead of them all being on 465 makes it possible to turn the wick right up and there you are.

"All right, I'll take your word for it—I can't stay now. Only dashed round to collect my valve as I want to try some experiments myself. This it. Thanks, cheerio."

Good-bye, Bill. Darn. Now I'll have to go and buy a mixer valve.

TO THE POINT (QST, August 1939).

The mark of a good receiver isn't what it will bring in, but in what it will leave out.

WHAT TO DO WITH MY RADIO GEAR!

By "Emmel."

That's **the question!**

How often, in the last few weeks, have you ambled moodily into the shack, cast a longing glance at the rig, at the new bottles, the old key, the time honoured junk . . .

Breathes there a Ham whose soul hath not said, "Why must I let it lie so? Why can't it be used? What use can I put it to other than its original allotted job?

Suddenly the thought dawns that all the valves, transformers, condensers, instruments — indeed even the racks and chasses could be adapted to other uses. When connected a certain way, they are known to perform the most wonderful of modern miracles. Why not try connecting them in other ways and see what results can be obtained?

Many of the greatest advances made in the course of developing the Science of Electricity have been due to the adaptation of ideas or designs brought to a certain stage by the neighbouring sciences and then rejected or shelved for some reason. That's a pretty bald statement, but read it again, then try and think up an instance. You, who have delved into the progress of science won't find it difficult. The early development of the Radio Valve is an excellent example.

Already Radio Valves are being put to industrial uses quite divorced from wireless applications. In fact, they have led to the production of special tubes for these purposes. Hence we have Thyratrons, Ignitrons, Phanotrons and more "Thingummytrons" to come. Their development has lagged several years behind that of Radio Valves, but this only gives us a start over the other hobbyists or pseudo-scientists.

Most hams have a very up-to-date knowledge of recent advances in Thermionic Valves, and hence are well equipped to study the new fields. Of course, one cannot expect hams to emulate the successes of well staffed scientific laboratories, but it must be admitted that we have a knack of doing big things with a minimum of equipment. Indeed, this very fact has been the despair of

many a learned Professor, who has tried to coax his occasional ham student into using complicated methods when makeshift ones appear to give the same answer!

The idea I've been hatching is that we can get new diversions and build up a new hobby by putting our radio gear to new uses. They need not be so ambitious as suggested above. Even the most humble ideas can render a great deal of pleasure and satisfaction.

No doubt the Pick-up and Turntable will continue to rattle the chinaware and rouse the neighbours, the short-wave receiver will be in its element getting the latest news from overseas, and the instruments in the rig will make up a nice test kit for future use.

Supply houses already report an increased demand for cathode-ray tubes, indicating that many hams have turned their attention to this very absorbing field.

But can someone tell us how we can use our old moving coil speakers. maybe to provide inter-bedroom communications or front door to kitchen communication? (That would shake the vacuum cleaner salesmen!) Can anyone give us hints on making gramophone recordings at home? Can we get a lead into home talkies?

I'm sure we can. All these and many more fields can be covered in this magazine by hams who will have obtained results and are glad to pass the information on. Someone may tell us how he remotely controls his junior ops. toy railway, somebody else may describe a burglar alarm. These are just scattered thoughts and probably dozens of others will suggest themselves to you.

We want to work valves and radio gear into these gadgets as much as possible so we can keep familiar with them. It is vitally important that when hostilities cease, and we approach the authorities for new licences, that we produce evidence of having kept our knowledge of Radio Theory fresh.

In the past, we have been accustomed to swopping ideas over the air, we must now air our ideas through this magazine, which is our only common hander outer of information.

Go to it!

A Noise Limiter with Automatic Control

(Incorporating Infinite Impedence Detector and Amplified A.V.C.)

By K. Heitsch, VK3HK.

After looking through various "mags," and trying just about every type of noise limiter without obtaining results that satisfied the writer, it was decided to experiment a little and the circuit described is the result. The oscilloscope proved very useful in these tests. This limiter is just as effective as the best I had previously tried, but with the additional advantage that the signal can fade badly without requiring any manual adjustment. An initial adjustment of the threshold control on no signal is all that is required.

In order to obtain satisfactory results on fading signals, I would advise the adherance to the circuit values given, as these were experimented with to get the best results. The infinite impedance type of detector has advantages over the usual diode in (1) better selectivity, (2) higher gain than diode, (3) high fidelity (it will handle 100% modulation with less distortion than a diode).

In order to check the damping imposed on the secondary of the I.F. transformer when nursing a diode as compared to the inf. imp. detector, a test was made. The oscilloscope showed the I.F. signal voltage on the secondary and then the plate voltage was removed from detector so making it a diode in action. The signal voltage dropped to about half, indicating a drop in impedance imposed on the secondary by the diode. In explaining the circuit, it will be noticed that the positive drop across the .1 and .25 meg. resistors in series is **more** than balanced by the negative drop across the earth end of the 15,000 ohm potentiometer, so biassing the 76 grid negatively. By adjusting this, it is possible to bring the A.V.C. line to earth potential. The writer uses a magic eye on the A.V.C. line and adjusts till the eye is **only just** wide open on no signal. Before making the above adjustment, turn the 10,000 ohm potentiometer to the 5000 ohm resistor end. A carrier on the 6C5 grid will cause the 76 grid to become less negative, due to the increase in the positive drop across the .1 and .25 meg. resistors, the A.V.C. line will then become negative.

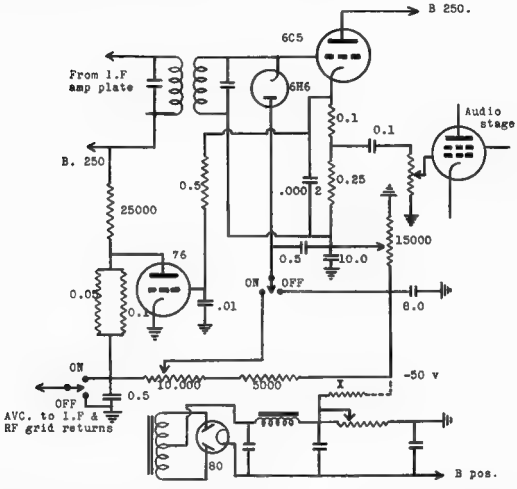
The noise limiter 6H6 picks up some of this negative voltage, so delaying its action and stopping it from blocking with the carrier. With the resistor values given and a measured 50 volts negative above earth at the point indicated, the 10,000 ohm potentiometer is adjusted on no signal so that the background of the receiver is just starting to be cut off. It will then be found that even the strongest signal will not block when the A.V.C. is being used. When the switch is off, the 6H6 gets a negative voltage from across the negative end of the 15,000 ohm potentiometer applied between plate and cathode, putting it out of action. The two diodes of the 6H6 are used in parallel.

The 50 volt negative may be obtained by other means than that shown, but the method shown suits the writer's power pack arrangements best. The resistor marked X is about 15,000 ohms, but may be replaced by a small iron cored choke to reduce the voltage drop through it if desired. The idea of taking the audio feed from between the .1 and .25 meg. resistors is to make sure that no r.f. gets into the audio stages, no r.f. choke is needed. The audio stages in the writer's set is a 6C6 pentode followed by a 2AC, this combination gives more gain than is required, however, so the audio gain control is needed.

A beat note oscillator may be coupled to grid of 6C5 by twisting an insulated lead from oscillator around the grid lead from sec. of I.F. transformer a sufficient amount to give the desired degree of coupling. It might be thought, on looking at circuit that the .5 mfd. condenser across A.V.C. line is too large, but as the resistance to earth at this point is

much lower than is usual, this is in order. The point that will probably be appreciated with this noise limiter is that once initially adjusted, it is ready for instant use when needed by the flick of the switch, no matter what signal level is being received. In fact, both the potentiometers may be mounted at the back of chassis if no room is available on the panel, so it is possible to alter most any multi-tube super. to take this circuit.

And lastly, the writer would like to hear from anyone wanting more details.



15 Watt Modulator

To Modulate 30 Watt Carrier

By R. W. Best, ex VX2TY.

Having need of a rather decent amplifier for use for P.A. work, and also with an eye to the future for a modulator, the following circuit was evolved. After some experimenting (which after all is the essence of our existence) the amplifier was at last ready for use, and fully justified the time spent on its construction. The original circuit had push pull E.L.3 tubes in the final and was quite satisfactory, and is still used in the Public Address amplifiers. Requiring a little more power for use as a modulator, we hunted up dope on numerous tubes in the Continental range. The only other worth-while tube available was the E.L.5, which seemed quite a reasonable proposition until we turned to the 6L6. The 6L6 offered numerous advantages, the main one being its adaptability to Class B or AB, and so it was chosen. Another big point in its favor was its R.F. characteristics, which naturally appealed on the score of economy of surplus tubes. In using the 6H6, the glass version was

chosen owing to the lack of trouble experienced with this tube as against its metal prototype.

So much for the output stage. The driver stages could quite easily be metal tubes, such as the 6N7, to replace the 6A6 and the 6C5 to replace the 75. The glass tubes were used here because it was found that we already possessed them. Actually the tubes used are 75 — 53 — 2/6L6-G's, but the 53 serves the same purpose.

The microphone first used was a D104 xtal and gave excellent results, but the price was just a little too much for the bank roll. Examination of the microphones procurable showed a little job with possibilities, the Regal Double Button Carbon, which proved to be all that was necessary for our requirements.

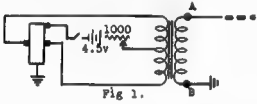


Fig 1.

The pick-up, which is seldom used, is a B.T.H. Senior. The B.T.H. Junior works quite well, and could quite easily be used. If the ham is mechanically-minded, the best proposition is to buy a xtal cartridge and make your own tone arm. The main requirements are balance, minimum weight and freedom of rotation.

The modulation transformer should be made to match Class A 6L6 valves to the Primary and whatever secondary impedance is required. The nett trade price should be between 15/- and £1.

The potentiometer used in the grid circuit of the 6L6 G's is to get correct balance in the amplifier, and in some cases, it may be unnecessary. Nevertheless, its cost is only small and its inclusion is recommended. The tone control was originally installed to help in the overcoming of feedback with the xtal mike whe nused as a P.A. equipment. To obtain best results, I would suggest that it be included.

Although it may seem unnecessary to couple the pickup into the preamplifier, I would point out that the gain in the 6A6 is not terrific, and even should the 75 give too much gain, the volume control on the pickup may be used to limit the input to the grid of this tube.

The original chassis measured only 12 in. x 7 in. x 3 in., but I think a better size would be about 15 in. x 8 in. x 3 in. This chassis also holds the power supply.

Should this modulator be mounted in a rack, as is often the case, together with the rest of the rig, care should be exercised in the placement of the various sections of the rig.

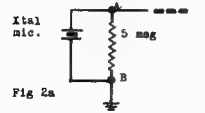
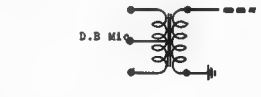


Fig 2a



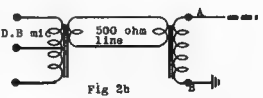


Fig 2b

It seems to be the general rule to mount the power supplies on the bottom, and to put the modulator in the next shelf. If this is done, shielding of the power supply will probably

be necessary to prevent hum pick-up in the pre-amplifier.

A simple means of doing this is to place a sheet of black iron, suitably painted, below the modulator, i.e., just above the power supply for the rest of the rig. If this is earthed, it will effectively shield the pre-amp.

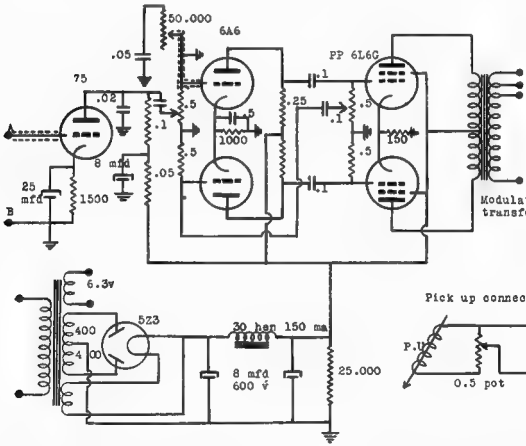
As mentioned previously, the modulator power supply is mounted together with the modulator on the one chassis. By keeping the power supply to one end, this arrangement is quite satisfactory, and has the advantage of making the modulator completely self-contained. No method of mixing has been shown for the pre-amplifier as this job was primarily designed for microphone use only, and not to turn the rig into a B.C.L. transmitter.

Numerous methods of mixing suggest themselves, and if the reader has been buying and saving "Amateur Radio" for any length of time, he will find among his back copies, at least one method which is quite satisfactory for mixing speech and music if required.

The first diagram shows the method of connecting the double-button mike into the matching transformer. This is the circuit given by the Regal people and is the best tried to date.

Fig 2A shows the alternative connections for xtal or D.B. Carbon mikes. Fig. 2B shows a suggested means of connecting for any long distance microphone work.

Fig 3 shows the modulator circuit diagram.



In conclusion, this amplifier has been found to give excellent results, and although high fidelity results are not claimed for it, if all Ham 'fone sounded as good as the quality obtainable from this job, we should have no further worries.

A final note of warning. No fone sounds better than the impedance matching arrangements will allow.

Contest Notes

R. E. Jones, KB3RJ, Federal Contest Manager.

80 METRE FONE CONTEST.

The contest committee and the N.Z.A.R.T. are gratified at the splendid activity and great interest shown in this contest. Ten VK logs were submitted in the Unlimited Section and seven logs in the Limited section, and included entries from all divisions excepting VK7. Results of the contest will be announced by the N.Z.A.R.T. in due course.

D.A.S.D. CONTEST.

The VK Contest Commitee cast longing eyes on the month of August, 1939, intending to push the VK-ZL 160 metre test and the VK all-band contest into that month, as it was expected in view of the international situation it would be highly improbable that the D.A.S.D. would stage their annual DX contest this year. However, somewhat belatedly the rules of the German contest came to hand, and there was nothing else to do but to reserve August for them. Look how they treated us—their own contest became a wash-out and we lost our own contest entirely.

FEDERAL AND VICTORIAN Q.S.L. BUREAU.

R. E. Jones, VK3RJ QSL Manager.

The enforced period of inactivity should enable all hams to catch up with their qsl. Cards can be forwarded to all non-enemy countries at the usual Bureau rates and with the usual promptitude.

The address of the Manchukuo QSL Bureau is:—MX3H, Box 30, Shinkyo, Manchu-Kuo.

Visitors to Melbourne during September were VK3KS and VK3XB. Both were in the pink. Fritz Haas, ex UO1FH, well known to DX hams of 1928/1932, also dropped in whilst en route from VK2 to Adelaide. Fritz has been in VK for nearly a year and intends to stay put in this country.

The following VK3 stations should now be able to find time and postage to send for their cards, which are languishing at this Bureau, 23 Landale Street, Box Hill.

3AC, AE, AP, AS, AX, AY, BD, BE, BF, BG, BH, BK, BN, BS, BV, CA, CH, CQ, CU, DI, DJ, DS, DU, EF, EH, EI, EL, ES, EU, EV, EW, EZ, FA, FG, FW, GB, GD, GE, GP, GR, GU, GX, HI, HV, IA, IB, ID, IE, IF, IM, IP, IS, IT, IU, IV, IY, IZ, JM, JP, KQ, KT, KY, LF, LH, LI, LM, LQ, MJ, NB, NC, ND, NT, OA, OE, OI, OU, OZ, PC, PH, PK, PJ, PL, PV, QE, QG, QT, QZ, RF, RL, RV, SC, SE, SK, ST, TA, TC, TD, TF, TM, TP, TY, UC, UV, UX, VA, VB, VB, VV, VW, VX, VZ, WC, WH, WR, WT, XC, XG, XK, XL, XQ, XR, XU, XZ, YG, YH, ZC, ZD, ZG, ZJ, ZL, ZO, ZS.

The enforced inactivity falls especially heavy on Ted Jenkins, VK 3QK. Ted is moving for the summer to Churchill Island, just near Phillip Island in Westernport, and had built up a nice portable for use down there. A brand new steel tower, with a 3 element rotary beam at his Elwood QRA has to wait until "apris la guerre finish" for its initial try out.

28-56 MC Notes

A. Pritchard, VK3CP.

Well, chaps, another month has pased, and doesn't it make the heart of the ham sad! — especially with such wonderful conditions as we are having at present on ten; five is very dead, still it is worth watching in the hope of sigs from the States. Considering the very good strength of London on 16 metres at 10 p.m. these nights, we would probably be hearing the Europeans at the accustomed time of 7 p.m. if any were lucky enough to be still on ten. I would like to thank the lads for that dope on receiver-antenna experiments— still hoping, hi. VK3YT, of Ballarat, was here in Melbourne a few weeks back and had a few qso's on 'phone (P.M.G. variety!). Alan informed me he was getting real efficiency on 56 mc with his xtal controlled rig, still it will keep and the receiver is now being put through its paces. 3BQ has finished the experiments with his double converting super, and has now built his idea in permanently. The signal is amplified at ten metres with the 1851, then converted to 1500 KC in the 1st det., next converted to 500 KC and amplified with another stage at that freq. then detected in the usual 2nd det. The 2nd converter stage with the 2000 KC xtal osc., now has a single tube, i.e., a Phillip EK2 combination oscamps type. This xtal freq of 2000 KC could be altered to a freq having its harmonics just a few KC's out from the low edge of the ham bands, say 2332 KC and by not shielding this oscillator, a beat on 6996 KC's would give the 40 mx band just 4 KC's higher, and so on, an excellent marker, always on the job. The circuit constants on the 2nd det. here in use at CP may be of value for the chaps thinking of putting in an R meter. I use a type 53, but the 6V equivalent, 6A6 and N7, give the same results. The tube, being a twin triode, one section is used as an anode beam det. and the other as the beat osc. As the tube has a common cathode for the two sections, care must be exercised with the amount of current used in the osc section, when switched in, otherwise this extra current flowing through the cathode bias resistor produces far too much bias for correct anode-bend det. action. I use just under a meg. i.e., 760,000 ohms for dropping the voltage in the osc plate circuit, and this limits its current to only one-tenth of a mill. and the tube oscillates perfectly at this very low current, the circuit being shunt fed Hartley. The values of the detecting section are: 30,000 ohms cathode bias resistor, with a .5 mf cond. across same, a 100,000 ohm plate load resistor with a 10,000 ohm de-coupling. This gives a standing current of .2 ma., and on each sig. rises providing the I.F. gain is set near the full on position (but not using any regeneration, 2 stages of 465 KC IF). The majority of sigs put the needle up to .7, but many put the needle off scale, W6POZ and W6NKF for instance, often hit .9 with the RF stage screen regeneration control turned off ,and this stage when off reduces a .9 signal back to .3 — a meter with a 1.5 mill scale would be ideal, as this is near saturation for this tube in this position. The figures as they stand make an ideal R scale, which compares very favourably with the HRO scale. The hiss cycles, due to heavy ionization, caused by Aurora displays, were putting the R meter up to the 1 ma. on 1st October at 9.30 a.m. The band was absolutely alive and packed full of sigs until 9.20 a.m., when they all disappeared to be followed by this terrific hiss. Talking with 3BQ at the time over the phone, we could hear the rise and fall of the hiss from the speakers, and the intensity of the cycles were perfectly in step. The band gradually came back to life with faint signals half an hour later. The States are at their best around 8 a.m. at present, with the cw portion showing plenty of life. vy 73.

Short Wave Notes

By M. Campbell, ex VK3MR.

Even now we are speaking about the days when we were on the air, and as I gaze at the pointers heavily leaning against their zero posts in the meters in the irg, I think back, and sigh. They WERE the good old days. Hams are still doing their bit, even in war time, and according to pre-war VK3CX, the boys in the R.A.A.F. come from all States and it's like one big ham convention. We can find plenty of time to study radio seriously now, and learn something about the more complicated theory which we were apt to pass over before. I must plead guilty to neglecting the ham bands in favour of the overseas propaganda, and can recommend some good code practice on DLN just lower in frequency than the 16mx stations. He uses ICW and his speed depends on the importance of the news, and varies from 16 w.p.m. for extra special news to 22 up to 30 for lesser stuff. The good sending to some extent, overcomes the weakness of the propaganda. There doesn't seem to be very much to break through more easily to the PK's and neighbouring countries with no qrm from VK's trying to "take" them off on fone! Much regret, however, is expressed by our pals in U.S.A., but we have the satisfaction to know that we were at least missed from the band! The band is not so easy to locate now, and while searching for it the other day, I automatically went over to switch on the CO to check the receiver, when something seemed to say, "you can't do that there here!" It's an empty world, although there is a position open as traffic manager for the W.I.A., the only qualification needed is to be able to copy the keying of VK2VN. By the way, Morry, don't you owe me a letter? Re countries. Our Mister Brown, 3CX, has come to light with 137 countries worked. He lives for new countries, and in between collects postage stamps, and is particularly interested in air mail stamps ,and would like to hear from others that way inclined. This stamp racket is spreading, as 3BM has fallen, too.

Latest list available for most countries worked is as follows: 3CX, 137; 2DG, 122; 3MR, 121; 3KX, 112; 2HZ, 101; 3HG, 99; 4JP, 94; 3BM, 67; 2AHM, 63; and 3XB, 61. The last two use about 4 watts. I am interested to know how some of the old timers in VK4/5 have fared, and also 2ADE, who has taken the lead in the contest, world, closely followed by 2DG. It would be also interesting to know how many contests you two chaps have won. What about it? Send in your list of countries worked while we have the chance to compile a stable list. (Very appropriate in view of the Melbourne Racing Season.—Ed.). It may interest someone to know that I have been working on an entirely new type of monitor for checking the tone of signals. As soon as all patent rights have been adjusted, full particulars will be given. It works on the principle of colour as produced by the modulation in the carrier, and has a very decided variety of colours for different notes. The best type of T9 signal apears as pure white, and varies down the spectrum to a dull brown for heavily modulated notes. One interesting point is that this monitor can be more capably handled by YL's, as colour blindness rarely, if at all, exists in women, whereas about 15 per cent. of the male species are colour blind. More later.

Divisional Notes

IMPORTANT.

To ensure insertion all copy must be in the hands of the Editor not later than the 18th of the month preceeding publication.

N.S.W. DIVISIONAL NOTES.

President: H. F. Peterson, 2HP.

Vice-Presidents: W. G. Ryan, VK 2TI and F. Carruthers, VK2PF.

Secretary: C. Horne, VK2AIK.

Treasurer: H. Ackling, VK2PX.

Interstate visitors should telephone FX3305.

The September general meeting of the Institute was the first held since the outbreak of war, and it is quite safe to say that the attendance was the largest for some considerable time. The chairman, in his opening remarks, gave details of steps taken by Council since the outbreak of hostilities to place the resources of the Division at the disposal of the Defence Authorities, the principal of which being an offer to train a body of Telegraphists to a standard necessary for service in any Arm of the Defence Forces. Letters of appreciation of this offer was read from the Minister for Defence and the Commanding Officers of the First and Second Division Signal Sections. A communication was also addressed to the Senior Radio Inspector asking that present licencees be allowed to retain their Call signs, and an acknowledgment has been received granting this request, and a further communication states that Experimenters will be given credit for the unexpired portion of their licence when applying for a Broadcast Listeners' Licence. The meeting unanimously endorsed all actions of Council.

It was decided that a time would be set aside at general meetings for the discussion of Ultra High Frequency topics, and Mr. Ross Treharne, VK2IQ, was elected to the position of Director of U.H.F. Activities, the Chairman of the U.H.F. Section, VK2NO, having previously intimated that pressure of business would preclude him from accepting that position.

Meeting agreed that all Members on Service should be made Honorary Members for the duration or period of service, and that a Comforts Fund be organised as soon as possible.

Quite a number of the Institute Members of the R.A.A.F.W.R., were present, and were given a hearty welcome by all present.

An interesting lecture was delivered by Mr. Jack Fraser, VK2AFJ, on "Vacuum Tube Amplifiers," and was well received by members, who commended him on filling the breach at very short notice. 2AFJ has the real Amateur Spirit, and whilst we have members with his spirit and enthusiasm, the Institute will continue to forge ahead.

Council meetings have been slightly disorganised since the outbreak of war, due to several resignations of members who are at present unable be in regular attendance due to Emergency Services. Messrs. Bennett, 2VA, and Moore, 2HZ, have tendered their resignation and Council were loath to lose their services, but their action in making way for others, who at present are free to attend, is to be commended.

Mr. Ross Teharne, VK2IQ, has been elected to one vacancy and the other will be filled at a later date.

Any member serving in any of the Defence Arms is asked to communicate with the Secretary and give details of his unit, together with the calls of any other "ham" that he may know of. (See Amateur Radio Register.—Ed.). Also it is of the utmost importance that members keep the Division informed of any changes of address as due to the non-publication of the monthly supplement, it will not be difficult to lose track of some members.

Let every Division of the Institute make their watchword the same as VK2—"Carry On."

WAVERLEY RADIO CLUB NOTES.

By F.A.B.

Despite troubled waters elsewhere, affairs at the above club have gone on smoothly during the last month.

On the 26th September, a demonstration of hi-fi amplifiers was given. Amplifiers were brought along by Ted Rodgers and Dev. Dunn. Ted relied on a large horn with a 3 foot flare in front of his speaker to give him his low notes, while Dev used an ordinary baffle. Honours were equally divided for what one gave in low notes the other made up in highs. The amplifiers were finally checked with an oscilloscope.

I must be forgiven if I digress a little here. At a former amplifier night, some years ago, arrangements were made to compare the results obtainable with transformers and resistance coupling. Several amplifiers were placed behind a screen, and the audience, after hearing each, were asked to vote on which they considered was the best. The experts to this day are trying to explain why the bulk of the votes went to one using small "Junk" transformers.

Arrangements are being made for another picnic to National Park. The previous one was to have been held on September 3rd, and was of necessity cancelled. This time unworried by cranky transmitters and the like, we should have an opportunity to really enjoy the beauties of the scenery.

I would like to invite anyone interested in radio to meet the hams of yesterday in the Clubrooms, rear of "Almont," 13 Macpherson Street, Waverley, on any Tuesday night. They are assured of a pleasant evening.

AMATEUR RADIO NOTES. VK4 DIVISION.

By VK4LT.

Friday evening, September 29th saw the monthly meeting of the Q'ld. Division of the W.I.A. at Ye Olde Head Quarters, George Street.

Mr. A. Walz, VK4AW presided.

As the old saying goes, "It's an ill wind that blows nobody good," so the war had its compensations, for we were treated to a show of old faces, some rarely seen at H.Q.

VK4's were present: AW, ZU, UL, VJ, JP, DY, HR, KF, WL, RC, JF, HU, ES, LT, SN, DM, WT, RT, UU, FB, FJ, WB, UR.

After a lengthy debate on the international situation between members, all ganged up and a few bedtime stories (or were they) were told. The meeting started at 8 p.m., more or less.

When things got organised properly, and members made themselves properly comfortable the meeting was commenced. It proved a great success, and as the subject under discussion was the future of the W.I.A., members were serious for once in their lives, and great enthusiasm was shown by all with regards to carrying on.

It was decided unanimously to "carry on as usual," holding our usual monthly meeting, and lectures are to be arranged for each night.

The meeting was then concluded and VK4KF gave a very interesting lecture on A.C. Motors, which was absorbed by all Members.

Showing the keenness of our country hams, VK4SN, Frank, from the one ham town of Goomburra, travelled 3½ hours per his car to attend the meting, and he assured us that the Warwick and District boys were keen to keep the W.I.A. operating, War or no War. F.B. boys, and very glad to hear same.

Then refreshments were to be served "gratis," but alas the cupboard key was not to be found, so most of the gang gathered in "Joes" and held quite a social gathering till the party broke up about 11.30 p.m.

So notes from VK4 Division will be forthcoming as long as AR continues, and I've got 2d. for a stamp.

Any notes, Radio or otherwise, regarding Hams will be appreciated by the New Publicity Scribe.

HAM NOTES.

VK4ZU. — Howard, now off Hi. Freq. and in the Low Freq. with Wireless Div. of Militia.

VK4HR—Tibby will sell out for £100. (On the lay-by—Editor). What offers?

VK4FB—Behind the scenes, building a 7 or 8 Tube Super to combat the after war QRM.

VK4SN—Frank has a 4 section 8JK just installed working overtime as a trapeze for Magpies.

VK4ES.—Herb. being married this month—poor Sap—and going up to the old home town for celebrations. Best luck, Herb.

VK4VJ.—Vince only complaint was the apprentices from shop were all going away to the Camps.

Royal Australian Air Force

VACANCIES FOR WIRELESS OPERATORS

Applications will be received from amateurs in all States.

Details of enlistment from the Secretary, Air Board, or W.I.A. Divisional Headquarters.

Apply at once by mailing the form below.

The Secretary,
Air Board,
Victoria Barracks,
MELBOURNE, S.C.1

I wish to enlist in the Royal Australian Air Force as a Wireless Operator. My age is years*, I hold the A.O.P.C. and can send and receive at w.p.m.* I am available for immediate war service.

Signed

Address

Date

*Age limits are 18 to 35 years and minimum operating speed is 16 w.p.m.

NOTE 1.—Enclose separate sheet giving full details of qualifications, etc.

NOTE 2.—Persons who do not possess the above qualifications, but who are desirous of enlisting for training as wireless operators may do so by applying to the above address stating full particulars.

VK4RT.—Johnnie, our late secretary, sat back and enjoyed proceedings.

VK4RY.—Bill having holidays in Sydney.

VK4WT.—Old Bill has been called up for the Air Force.

VK4HU.—George, also a Military guy now. Member of the Signal Corps.

VK4DM.—Dave still manages to talk Radio and had a good rag-chew with 4SN at meeting.

VK4AW. — Arthur still keeping things organised for W.I.A. VK4 Division.

VK4KF.—Keith said he had no notes for his lecture on A.C. Motors at meeting ,but we guess he doesn't need any after that lecture.

VK4LT.—This poor sap started up a 10 Tube Super. the day our licences were suspended, so the B.C. Stations get worked overtime on it. Also a Member Wireless Section, Sig. Corps.

VK4CJ.—Poor Cedric, transferred to VK8HI.

VK4UU.—Bill now has no QSL cards to play with. Guess Motor Bike gets more attention.

S.A. DIVISION NOTES.

Ex VK5RM.

Towards the end of last month, a code speed test was held. The test was held under examination conditions by Mr. De Cure, who very kindly came along and tested everybody's speed, and also gave us a great deal of valuable advice on how to handle a key and improve our sending generally. The average speed was about 18 words per minute, and the maximum speed was 28 words per minute, one member passing this section. The tests started at 12 words per minute and ended up at 28 w.p.m. ,and it is hoped to repeat them at regular intervals, with a view to keeping a check on each person's progress.

A number of members have decided to sit for the Class B examination at the end of the year, to see if they can get the B Class certificate.

Now that there is no more DX to work, and no more skeds to keep, and therefore no earthly reason for staying at home, the meetings are becoming very popular indeed. Wednesday evenings appear to be more popular than Friday evenings, and there is usually a crowd on these nights. Some of the members of the student classes, who have been successful in their A.O.C.P. exam., will now join the advanced class, and this should swell the crowd.

Quite a number of hams from South Australia, who were members of the R.A.A.F. wireless reserve have gone over to Melbourne for a month's training. It is reported, however, that still more are required for the scheme, and more applications are needed.

There have been no technical lectures for the past two months, but it is hoped to continue them later. In the meantime, the code classes will continue as usual, and we will probably have a test during the second week of November, if it can be arranged. The date will probably be November 10th, but this has not yet been fixed definitely.

WESTERN AUSTRALIAN DIVISION.

By VK6WZ.

There is a strong resolve in W.A. to keep the W.I.A. going and to hold the members together. In the absence of the friendly contact per ether we must do something, and the first moves by this Division have been the decision to hold an extra "meeting" or informal evening each month, and the move to make permanent the series of television lectures to be given by 6GM. These lectures will cover the principles of television, and in order that country members shall share in the scheme, and all members be supplied with permanent records of the course for future reference, the monthly letter to members will in future be enlarged to carry instalments of this course.

A ladies' auxiliary is to be formed from among lady members, YL's and XYL's to assist the newly-formed Activities Committee in its work of running the extra monthly get-togethers. There will be no transaction of formal business at these evenings, and their form will be elastic enough to embrace all sorts of entertainments, lecturettes, outings, and "rag-chews." We have hopes of a special show for the November evening, which will introduce the idea. Mr. Hayman, of the Technical College, a patron of the Division and a firm supporter of our cause, has promised an interesting and enlightening evening for members and their friends. If his other commitments allow, he'll supply us with our November show. Further dope forthcoming in time for the November

general meeting and circular. The social evenings are fixed for the fourth Tuesday in each month and the W.I.A. calendar now reads:—

1st Tuesday—Council.
2nd Tuesday—General.
3rd Tuesday—Activities Committee
4th Tuesday—Social Evening.

Members of the Division attached to the various defence arms and either called up or likely to be include:—6CC, 6IG, 6TM, 6AF, and 6ZX. The position of others, including a number of country chaps, is unknown. (See Amateur Radio Register.—Ed.).

Several members have taken an interest in talkie projection, and it's likely this disease will spread. 6CC was observed at the October meeting brandishing a camera tripod. 6EL and 6WH admit interest in celluloid sound. 6BB still interested in high-speed film for taking snaps at the movies and also blowing the dust off the talking-light-beam gear. 6GB has been promoted to the ranks of broadcast ops. and is slowly fading away as a victim of "needle-watcher's neurosis." 6BW is planting out 913's under glass in the hope they'll grow 9-inch screens. Threatens to take up wired television. 6YZ talks of trading-in the piano-accordion on a B/C set; don't do it, Dick—the programmes are lousy, anyway! 6EC and others seem interested in home-recording, and we might have some lectures on that topic before long. The only country news comes from 6FL, who is busy with p.a. work, and is doing Daventry pick-ups for a local station.

HAMADS

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